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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/523,534

02/02/2005

Frederik Hendrik In'tveld

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02/14/2006

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INTELLECTUAL PROPERTY & STANDARDS
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EXAMINER

COLEMAN, WILLIAM D

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 02/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/523,534	Applicant(s) IN'TVELD ET AL.	
	Examiner W. David Coleman	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>02/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

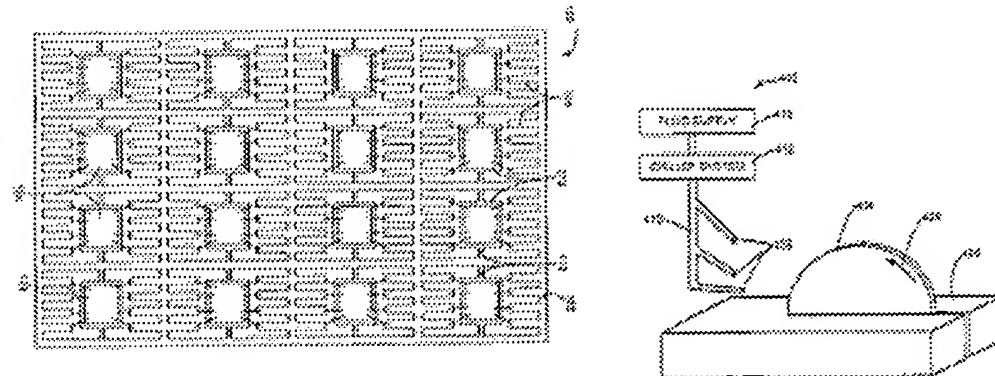
Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1, 4, 5 and 7-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hu et al., U.S. Patent 6,467,278 B1 in view of Suzuki U.S. Patent 6,401,705 B1.

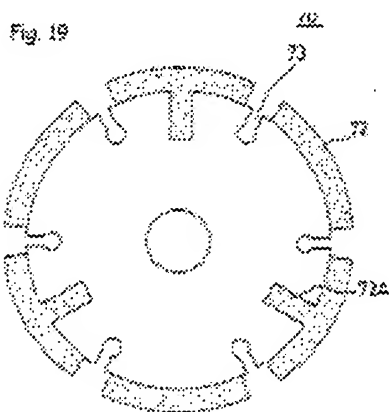
Hu discloses a semiconductor process substantially as claimed. See **FIGS. 1-5**, where Hu teaches the following limitations.



3. Pertaining to claim 1, Hu teaches a method of manufacturing a packaged semiconductor device comprising subjecting a metal carrier **100** provided with at least one semiconductor crystal **112**, the semiconductor crystals being provided with an encapsulation **140**, to a singulation step in a dicing apparatus that is provided with a dicing blade **404**, in which singulation step the dicing blade cuts, while being cooled with a cooling fluid **416**, through the

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encapsulation and the metal carrier (see Abstract) so as to singulate the at least one semiconductor device, characterized in that a friction force reducing cooling fluid is applied during the singulation step by means of the dicing blade. However, Hu fails to teach the dicing blade comprising diamond grains. Suzuki teaches a dicing blade 70 comprising diamond grains 72.



In view of Suzuki, it would have been obvious to one of ordinary skill in the art to incorporate a dicing blade comprising diamond grains of Suzuki into the Hu semiconductor process because the diamond blade of Suzuki cuts a workpiece while its isolated cutting elements or blade portions extending toward the center grind cut surfaces of the workpiece, cut surfaces of excellent finish are obtained (column 14, lines 19-22).

4. Pertaining to claim 4, Hu in view of Suzuki teaches a method as claimed in claim 1, characterized by the use of a dicing blade of sintered metal with sharp cleaving diamond grains, the sharp cleaving diamond grains being applied in the dicing blade in a concentration smaller than or equal to a maximum concentration, which maximum concentration is defined by the concentration at which the mutual distance between the diamond grains that contribute to the

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cutting is just large enough to allow removal of substantially all sawing debris (the Examiner takes the position that the saw blade of Hu will not rotate if debris is allowed to stay in the cut region).

5. Pertaining to claim 5, Hu in view of Suzuki teaches a method as claimed in claim 4, characterized by applying the sharp cleaving diamond grains in the dicing blade in a concentration larger than or equal to a minimum concentration, which minimum concentration is defined by the concentration at which the dicing force per diamond grain that contributes to the cutting is just low enough to prevent the diamond grain from breaking out of the dicing blade (the explanation of the rejection of claim 4 above applies to claim 5).

6. Pertaining to claim 7, Hu in view of Suzuki teaches a method as claimed in any one of the preceding claims, characterized by applying the metal carrier with a design that is symmetrical along sawing lanes along which the dicing blade cuts the carrier.

7. Pertaining to claim 8, Hu in view of Suzuki teaches a method as claimed in claim 7, characterized by providing side parts of the carrier with slots that are positioned in front of the sawing lanes

8. Pertaining to claim 9, Hu in view of Suzuki teaches method. as claimed in claim 1, characterized by providing the metal carrier with a reduced thickness at various locations (the

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Examiner takes the position that from the top view of the lead frame, where the openings are located, it is considered minimum thickness of the lead frame).

9. Pertaining to claim 10, Hu in view of Suzuki teaches a method as claimed in claim 9, characterized by reducing the thickness of the metal carrier from the bottom side of the carrier by means of etching (see, column 1, line 24 of Hu also, the Examiner takes the position that it is well known to etch lead frames, see supplemental reference by Fujita U.S. Patent 4,704,187, claim 8).

10. Pertaining to claim 11, Hu in view of Suzuki teaches a method as claimed in any one of the preceding claims, characterized by applying a ductile metal carrier like a copper carrier (the Examiner takes the position that it is well known to use copper as the metal in lead frames).

11. Pertaining to claim 12, Hu in view of Suzuki teaches a method as claimed in claim 1, characterized by applying a, preferably glass filled, epoxy encapsulation (the Examiner takes the position that glass filled epoxy encapsulant is well known).

12. Pertaining to claim 13, Hu in view of Suzuki teaches a packaged semiconductor device obtained with a method according to claim 1.

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13. Pertaining to claim 14, Hu in view of Suzuki teaches a metal carrier suitable for use in method according to claim 1 is characterized by a symmetrical design along sawing lanes where the carrier is to be cut.

14. Pertaining to claim 15, Hu in view of Suzuki teaches a metal carrier as claimed in claim 14, characterized by the provision of slots positioned in front of the sawing lanes.

15. Pertaining to claim 16, Hu in view of Suzuki teaches a metal carrier as claimed in claim, 14, characterized by the provision of areas with a reduced thickness.

16. Pertaining to claim 17, Hu in view of Suzuki teaches a dicing apparatus for subjecting a metal carrier provided with at least one semiconductor crystal that is provided with an encapsulation to a singulation step, in which singulation step a dicing blade cuts, while being cooled with a cooling fluid, through the encapsulation and the metal carrier so as to singulate the at least one semiconductor device, the dicing apparatus being characterized by the presence of means for supplying a friction force reducing cooling fluid during the singulation step.

17. Pertaining to claim 18, Hu in view of Suzuki teaches a dicing apparatus as claimed in claim 17, characterized by a dicing blade of sintered metal with sharp cleaving diamond grains, the sharp cleaving diamond grains being applied in the dicing blade in a concentration smaller than or equal to a maximum concentration, which maximum concentration is defined by the

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concentration at which the mutual distance between the diamond grains that contribute to the cutting is just large enough to allow removal of substantially all sawing debris.

18. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hu et al., U.S. Patent 6,467,278 B1 and Suzuki U.S. Patent 6,401,705 B1 as applied to claims 1,4,5 and 7-18 above, and further in view of Jacobs et al., U.S. Patent 5,372,220.

Hu in view of Suzuki fails to teach a method as claimed in claim 1, characterized by the use of synthetic oil as an additive to cooling water as the friction force reducing cooling fluid in the form of an emulsion of the oil in water. Jacobs teaches a synthetic oil in the form of an emulsion of oil in water (see column 3, line 1 and Table 1). In view of Jacobs, it would have been obvious to one of ordinary skill in the art to incorporate synthetic oil in water because it is primarily used in metal working applications (column 1, lines 14-15).

19. Pertaining to claims 3 and 6, the combined teachings fail to teach the ranges as claimed. Given the teaching of the references, it would have been obvious to determine the optimum thickness, temperature as well as condition of delivery of the layers involved. See *In re Aller, Lacey and Hall* (10 USPQ 233-237) "It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 f.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

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Any differences in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)

Appellants have the burden of explaining the data in any declaration they proffer as evidence of non-obviousness. *Ex parte Ishizaka*, 24 USPQ2d 1621, 1624 (Bd. Pat. App. & Inter. 1992).

An Affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).

Information Disclosure Statement

20. The Information Disclosure Statement filed February 2, 2005 has been considered.

21.

Conclusion

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856.

The examiner can normally be reached on Monday-Friday 9:00 AM - 5:30 PM.

23. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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24. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'W. David Coleman', with a large, sweeping loop at the end.

W. David Coleman
Primary Examiner
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